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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/881,460	06/14/2001	Douglas W. Couwenhoven	82887RLO	7546

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EXAMINER

MENBERU, BENIYAM

ART UNIT	PAPER NUMBER
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2626

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/881,460

Applicant(s)

COUWENHOVEN ET AL.

Examiner

Beniyam Menberu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE \_\_\_\_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 September 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____ | 6) <input type="checkbox"/> Other: ____  |

***Response to Arguments***

1. Applicant's arguments filed September 1, 2005 have been fully considered but they are not persuasive. U.S. Patent No. 6690485 to Borrell et al teaches of non-linear relationship between input and output value (column 3, lines 60-67; column 4, lines 1-8, lines 14-42; column 15, lines 65-67; column 16, lines 1-10; The "knee" effect taught by Borrell et al corresponds to the non-linear response to input data, thus Borrell et al disclose of the existing non-linear behavior of printing). With regards to ink depletion Borrell et al teach of implementing depletion when necessary with total colorant limit(column 12, lines 20-24, lines 53-58; column 16, lines 39-45, lines 64-67; column 17, lines 1-2; column 18, lines 1-5; column 16, lines 52-56; column 17, lines 49-53)

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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3. Claims 1-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6690485 to Borrell et al in view of U.S. Patent No. 5633662 to Allen et al further in view of U.S. Patent No. 6042211 to Hudson et al.

Regarding claim 1, Borrell et al disclose a method for modifying an input digital image having an (x, y) array of pixels, each pixel having an input code value for one or more color channels, wherein said input code value has a nonlinear relationship to colorant amount (column 8, lines 43-51; column 10, lines 16-31), to form an output digital image containing output code values for each pixel subject to a total colorant amount limit, comprising the steps of (column 16, lines 45-58):

- a) determining an input colorant amount for each color channel of a pixel in response to the corresponding input code value and a colorant amount function that relates the input code value to the colorant amount for the corresponding color channel (column 11, lines 48-54). However Borrell et al does not disclose
- b) determining a modified colorant amount for each color channel of the image pixel responsive to the input colorant amount for each color channel and a total colorant amount limit;
- c) determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount function that relates colorant amount to the output code value for the corresponding color channel, and
- d) repeating steps for each pixel in the input digital image.

Allen et al disclose a method for determining a modified colorant amount for each color channel of the image pixel responsive to the input colorant amount for each

color channel and a total colorant amount limit (column 4, lines 64-67; column 5, lines 1-2, lines 15-18, lines 25-32) and d) repeating steps for each pixel in the input digital image (column 5, lines 29-32).

Hudson et al disclose determining an output code value for each color channel of the pixel responsive to the modified colorant amount and an inverse colorant amount function that relates colorant amount to the output code value for the corresponding color channel (column 6, lines 17-26, lines 57-65).

Borrell et al, Allen et al, and Hudson et al are combinable because they are in the similar problem area of color printing.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to combine the method of colorant modification of Allen et al and the colorant amount transformation of Hudson et al with the system of Borrell et al to implement colorant modification and inverse colorant transformation subject to ink limitation.

The motivation to combine the reference is clear because Allen et al provides for a method to limit ink subject to a ink amount limitation so as to prevent excess ink usage (column 3, lines 26-31) and the method of Hudson et al is useful for printing color images which is independent of variances in ink volume (column 1, lines 59-64).

Regarding claim 2, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Borrell et al disclose that the input colorant amount is substantially linear with colorant volume (column 14, lines 56-62).

Regarding claim 3, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose the input colorant amount is a mass of colorant (column 6, lines 17-26; Hudson et al disclose transformation from tone level to ink volume. Volume of ink implies mass. ).

Regarding claim 4, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose a lookup table for each color channel wherein the colorant amount function is provided by the lookup table (column 6, lines 17-27).

Regarding claim 5, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Hudson et al disclose the colorant amount function and the inverse colorant amount function are substantially mathematically inverse operations from each other (column 6, lines 17-65; Hudson et al uses the same table 24, shown in Figure 2, to calculate volume from tone value and tone value from volume data, thus it can be shown that this table performs inverse operations.).

Regarding claim 6, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen et al disclose step b) further includes the steps of:

- i) determining a total colorant amount for each pixel as the sum of the colorant amounts for each of the color channels (column 5, lines 55-58)., and
- ii) determining the modified colorant amount for each color channel of the pixel responsive to the total colorant amount and the total colorant amount limit such

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that for such pixel the sum of the modified colorant amount for each color channels is less than the total colorant amount limit (column 5, lines 58-61, column 6, lines 4-8).

Regarding claim 7, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose that the colorants are inks for use in an inkjet printer (column 4, lines 28-31).

Regarding claim 8, Borrell et al in view of Allen et al further in view of Hudson et al teach all the limitations of claim 7. Further Allen disclose that the colorant amounts correspond to ink volumes (column 5, lines 27-31).

Regarding claim 9, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose forming a color image in response to the modified digital image produced by claim 1 (column 5, lines 20-23).

Regarding claim 10, Borrell et al in view of Allen et al and further in view of Hudson et al teach all the limitations of claim 1. Further Allen disclose a computer storage medium having instructions stored therein for causing a computer to perform the method of claim 1 (column 4, lines 3-4).

**Conclusion**

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37

CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Beniyam Menberu whose telephone number is (571)

272-7465. The examiner can normally be reached on 8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly Williams can be reached on (571) 272-7471. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the customer service office whose telephone number is (571) 272-2600. The group receptionist number for TC 2600 is (571) 272-2600.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.



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For more information about the PAIR system, see <http://pair-direct.uspto.gov/>.

Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

**Patent Examiner**

Beniyam Menberu

BM

01/05/2006

*KAWilliams*  
KIMBERLY WILLIAMS  
SENIOR PATENT EXAMINER